

## INTERNATIONAL SEARCH REPORT

Internat	Application No
PCT/IB2004/050487	

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 H03M1/08 H03M1/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H03M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2000 349637 A (MATSUSHITA ELECTRIC IND CO LTD) 15 December 2000 (2000-12-15) paragraphs '0044! - '0059!; figures 2,3,5	1,2,12, 16
Y		3-5
Y	PATENT ABSTRACTS OF JAPAN vol. 018, no. 661 (E-1644), 14 December 1994 (1994-12-14) -& JP 06 260861 A (HITACHI DENSHI LTD), 16 September 1994 (1994-09-16) abstract	3-5

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

30 December 2004

Date of mailing of the international search report

08.03.2005

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>CHEN F ET AL: "A 20-B DYNAMIC-RANGE FLOATING-POINT DATA ACQUISITION SYSTEM" 1 February 1991 (1991-02-01), IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, IEEE INC. NEW YORK, US, PAGE(S) 10-14 , XP000220450 ISSN: 0278-0046 page 12, column 1, lines 17-20 -----</p>	4,5

# INTERNATIONAL SEARCH REPORT

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al application No.  
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## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see annex

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5, 12, 16

Claims 1-5, 12, 16 are directed to a device as defined by claims 1 and 2, further defined by the gain determining circuit having two inputs (claims 1-5, 12) and corresponding method (claim 16).

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2. claims: 1, 6, 16

Claims 1, 6, 16 are directed to a device as defined by claim 1, further defined by a delay circuit (claims 1, 6) and corresponding method (claim 16).

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3. claims: 1, 7, 8, 16

Claims 1, 7, 8, 16 are directed to a device as defined by claim 1, further defined by a waveform generating circuit (claims 1, 7, 8) and corresponding method (claim 16).

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4. claims: 1, 9, 16

Claims 1, 9, 16 are directed to a device as defined by claim 1, further defined by a level adapting circuit (claims 1, 9) and corresponding method (claim 16).

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5. claims: 1, 2, 10, 16

Claims 1, 2, 10, 16 are directed to a device as defined by claims 1 and 2, further defined by the analogue-to-digital converter being of the sigma delta type (claims 1, 2, 10) and corresponding method (claim 16).

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6. claims: 1, 2, 11, 16

Claims 1, 2, 11, 16 are directed to a device as defined by claims 1 and 2, further defined by the analogue-to-digital converter comprising the second gain controller (claims 1, 2, 11) and corresponding method (claim 16).

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7. claims: 1, 2, 13, 14, 16

Claims 1, 2, 13, 14, 16 are directed to a device as defined by claims 1 and 2, further defined by a digital processing circuit and a digital gain controller (claims 1, 2, 13, 14) and corresponding method (claim 16).

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

8. claims: 1, 15, 16, 17

Claims 1, 15, 16, 17 are directed to a device as defined by claim 1, further defined by an automatic calibration circuit (claims 1, 15) and corresponding method (claims 16, 17).

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9. claims: 1, 16, 18

Claims 1, 16, 18 are directed to a device as defined by claim 1, further defined by the device being an audio apparatus (claims 1, 18) and corresponding method (claim 16).

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## INTERNATIONAL SEARCH REPORT

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PCT/IB2004/050487

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2000349637 A	15-12-2000	NONE	
JP 06260861 A	16-09-1994	NONE	